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PATENT  
130-129AMENDMENT  
S/N 09/460,107, FILED 12/13/99CLEAN SET OF CLAIMS AFTER AMENDMENT

12. An apparatus for performing a reagent protocol using polymerase chain reaction, comprising:

(a) means to index patterns of reagent wells on a continuous basis through at least one step of reagent addition to said reagent wells; and

(b) means to index said patterns of reagent wells on a continuous basis through a plurality of individual heat transfer stations, whereby at each of said individual heat transfer stations, said patterns of reagent wells are subjected to a unique temperature change to cause one amplification step, with said plurality of individual heat transfer stations providing total amplification required for said protocol.

13. An apparatus, as defined in Claim 12, further comprising: means to seal said reagent wells following said at least one step of reagent addition to said wells.

14. An apparatus, as defined in Claim 12 wherein: said reagent wells are disposed in patterns of said reagent wells in a thin thermoplastic web.

15. An apparatus, as defined in Claim 14, wherein: said reagent wells are formed in said thermoplastic web by embossing.

16. An apparatus, as defined in Claim 14, wherein: said reagent wells are formed in said thermoplastic web by thermoforming.

17. An apparatus, as defined in Claim 14, further comprising: a plurality of precision located indexing holes defined through an edge of said thermoplastic web to accommodate a tractor type of position controlled indexing drive.

18. An apparatus, as defined in Claim 17, wherein: said tractor type of position controlled indexing drive is selected from the group consisting of: walking beams, cam drives, geneva motions, electronic stepper drives, and pneumatic indexing mechanisms.

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19. An apparatus, as defined in Claim 12, further comprising: a variable code of holes defined through said thermoplastic web to provide positive identification of each said patterns of reagent wells.

20. An apparatus, as defined in Claim 19, further comprising: means to sense said holes, said means to sense said holes being selected from the group consisting of: physical contact, pneumatic sensing, and photometric sensing.

21. An apparatus, as defined in Claim 12, further comprising: at least one single or multiple well pipettor to accomplish said at least one step of reagent addition.

22. An apparatus, as defined in Claim 21, further comprising: said at least one single or multiple well pipettor is adapted to transfer reagents from reservoirs of single or multiple reagents to said reagent wells.

23. An apparatus, as defined in Claim 22, wherein: said reservoirs of reagents are refillable or exchanged automatically from stacks to provide continuous operation.

24. An apparatus, as defined in Claim 13, wherein: said patterns of reagent wells can be sealed to provide a liquid tight but peelable seal as provided by pressure sensitive adhesive or heat seal methods.

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25. An apparatus, as defined in Claim 13, wherein: separate heat exchanger compartments can be clamped to a lower surface of a thermoplastic web containing said patterns of reagent wells to form a liquid tight seal around individual said patterns of reagent wells.

26. An apparatus, as defined in Claim 25, further comprising: means to cause heat exchange fluid to flow through each of said separate heat exchanger compartments for specific time controlled periods.

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27. An apparatus, as defined in Claim 13, further comprising: means to peel sealing material from a top of said thermoplastic web to provide access to said reagents by a single or multiple well pipettor.

28. An apparatus, as defined in Claim 27, further comprising: a heated pressure roller in contact with said sealing material to apply a line of heat across said thermoplastic web to soften bonding of said sealing material to said thermoplastic web to permit ease of removal by applying tension to said sealing material.

29. An apparatus for performing a reagent protocol using polymerase chain reaction, comprising:

(a) means to index patterns of reagent wells on a continuous basis through at least one step of reagent addition to said reagent wells;

(b) means to index said patterns of reagent wells on a continuous basis through a plurality of individual heat transfer stations, whereby at each of said individual heat transfer stations, said patterns of reagent wells are subjected to a unique temperature change to cause one amplification step, with said plurality of individual heat transfer stations providing total amplification required for said protocol; and

(c) means to seal said reagent wells following said at least one step of reagent addition to said wells, wherein said patterns of reagent wells are sealed to provide a liquid tight but peelable seal as provided by pressure sensitive adhesive or heat seal methods.

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30. An apparatus for performing a reagent protocol using polymerase chain reaction, comprising:

(a) means to index patterns of reagent wells on a continuous basis through at least one step of reagent addition to said reagent wells;

(b) means to index said patterns of reagent wells on a continuous basis through a plurality of individual heat transfer stations, whereby at each of said individual heat transfer stations, said patterns of reagent wells are subjected to a unique temperature change to cause one amplification step, with said plurality of individual heat transfer stations providing total amplification required for said protocol;

(c) means to seal said reagent wells following said at least one step of reagent addition to said wells; and

(d) separate heat exchanger compartments can be clamped to a lower surface of a thermoplastic web containing said patterns of reagent wells to form a liquid tight seal around individual said patterns of reagent wells.

31. An apparatus, as defined in Claim 30, further comprising: means to cause heat exchange fluid to flow through each of said separate heat exchanger compartments for specific time controlled periods.

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32. An apparatus for performing a reagent protocol using polymerase chain reaction, comprising:

(a) means to index patterns of reagent wells on a continuous basis through at least one step of reagent addition to said reagent wells;

(b) means to index said patterns of reagent wells on a continuous basis through a plurality of individual heat transfer stations, whereby at each of said individual heat transfer stations, said patterns of reagent wells are subjected to a unique temperature change to cause one amplification step, with said plurality of individual heat transfer stations providing total amplification required for said protocol;

(c) means to seal said reagent wells following said at least one step of reagent addition to said wells; and

(d) means to peel sealing material from a top of said thermoplastic web to provide access to said reagents by a single or multiple well pipettor, said means to peel including a heated pressure roller in contact with said sealing material to apply a line of heat across said thermoplastic web to soften bonding of said sealing material to said thermoplastic web to permit ease of removal by applying tension to said sealing material.